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AMERICAN BASSWOOD

... *an American wood*

Basswood is distributed over much of the northern half of the States east of the Mississippi. The wood is light in weight, soft, uniform in texture, straight grained, and has low strength values. It is used principally for furniture, boxes, burial caskets, mobile homes, millwork, luggage, musical equipment parts, and athletic goods. Minor amounts are used for pulp in mixture with other hardwood species.

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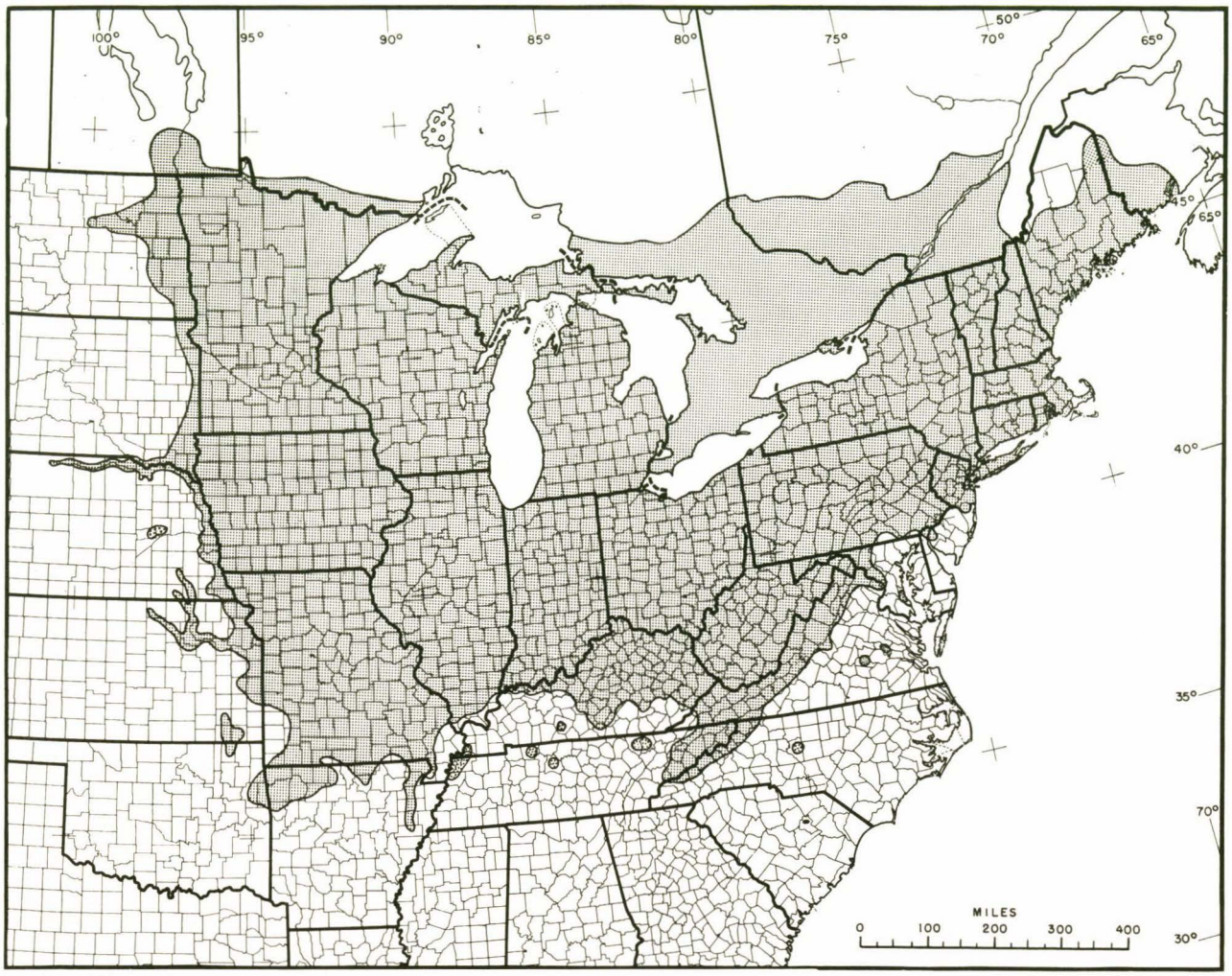

Figure 1.—Natural range of American Basswood, *Tilia americana* L.

F–506673

AMERICAN BASSWOOD

by Edwin Kallio and Richard M. Godman [1]

DISTRIBUTION

The natural range of American basswood (*Tilia americana* L. extends from southwestern New Brunswick through central Quebec and Ontario to the southeast corner of Manitoba, then southward along the eastern boundary of North Dakota to northeastern Oklahoma. The southern limit of the range occurs in northern Arkansas and Tennessee, western North Carolina and northeastward to Pennsylvania and New Jersey (fig. 1).

American basswood grows as a principal species in only two forest types: The sugar maple-basswood type in western Wisconsin and central Minnesota, the northern red oak-basswood-white ash type common to parts of New England, New York, Pennsylvania, and the southern Appalachians. Throughout the remainder of its natural range American basswood tends to be a minor component in 14 other forest cover types.

In the northern and western portion of its range American basswood grows at elevations varying from sea level in New England to about 3,200 feet in the Adirondack Mountains. It is commonly found in coves and protected valleys at elevations between 3,000 and 5,000 feet in the Appalachian Mountains.

American basswood grows most frequently in areas having an average July temperature of 65° to 80° and with a growing season precipitation of about 10 to 14 inches. Temperature extremes may range from −51° to more than 100° within the botanical range. In lower rainfall areas, particularly along the western limits of the natural range, the species is limited to lower north slopes in cool, moist locations. It is rarely found on the more exposed and drier sites.

Soil requirements of American basswood are relatively high. It grows best on deep, fertile, well-drained loamy soils. However, under favorable climatic conditions it can grow on coarse soils; for example, on sand dunes near Lake Michigan and on exposed, rocky ridges in Ontario and Quebec. American basswood tends to improve most soils. Its leaves rank very high in calcium and magnesium and they contribute significant quantities of nitrogen, phosphorous, and potassium to the soils.

DESCRIPTION AND GROWTH

On good sites mature American basswood can reach a height of 120 feet with stem diameters of 48 to 54 inches. The largest tree, located in northern Delaware, is reported to have a diameter of 66 inches. Both height and diameter growth rates are relatively high, and basswood trees, especially in the northern portions of the range, tend to be taller and larger than trees of the same age of other species. Maximum ages are estimated to range up to more than 140 years.

In forest stands, basswood trees are characterized by straight, limb-free trunks terminating in narrower and shorter crowns than most of its associated species. American basswood trees often grow as a cluster of stems that develop from sprouts around an old stump (fig. 2). The crowns of typical trees consist of large, dark green leaves on stout twigs, with large buds, that cover less than 40 percent of the total tree height. Although the species is moderately tolerant of shade throughout its life, the lower branches readily prune themselves leaving a clear stem with few, if any, surface defects.

The bark of young American basswood trees is dark green and shiny. On older trees it becomes grayish with deep, longitudinal fissures. The common name of the species may have originated because of the strong bast fibers in the bark which were used for cordage by primitive people.

Although American basswood produces large quantities of seed nearly every year, few seedlings become established in forest stands. The small nutlike seed, produced in clusters attached to a straplike bract, has both

[1] Research Foresters, North Central Forest Experiment Station, located, respectively, at Duluth, Minnesota, and Rhinelander, Wisconsin.

NOTE: This publication supersedes "American Basswood," unnumbered, issued 1945.

F–258923

Figure 2.—American basswood (*Tilia americana*) and young sprout trees.

an impermeable seed coat and embryo dormancy that severely restrict germination (fig. 3). Untreated seeds have been observed to remain dormant longer than five years under field conditions. In forest nurseries, good germination can be obtained by following carefully prescribed steps in treating the seed coat and stratifying the seed for several months. Limited field trials indicate that under certain conditions American basswood can be recommended for forest planting.

The primary method of regenerating basswood in most areas is through stump sprouts. Few hardwood species equal the capacity of American basswood to produce sprouts which often develop without defect or loss of growth vigor. Because of the difficulty of obtaining natural seedling regeneration, most management systems depend on stump sprouts for renewing the species in forest stands.

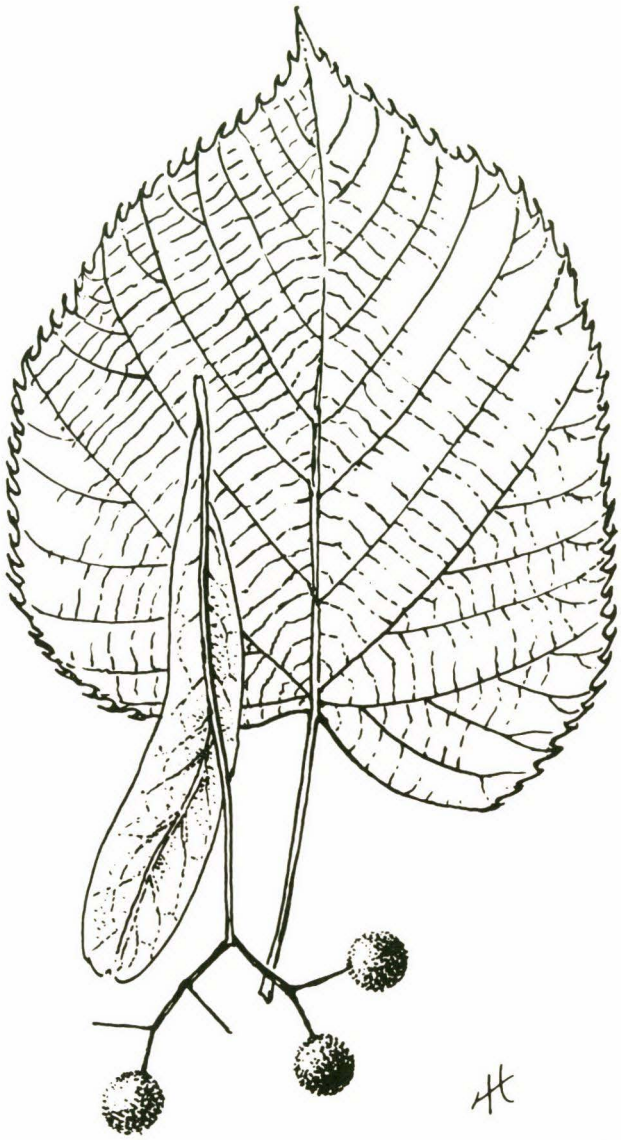

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Figure 3.—Leaf and fruit of American basswood.

American basswood is not seriously affected by insect pests although several leaf-feeding insects and at least one wood borer attack the species. The most serious pest is a decay fungi, the heart-rot yellow cap (*Pholiota adiposa*), that leaves a hollow center of varying size extending almost the entire length of the main stem. Few trees are lost through windthrow because of the wide spreading root system. Wildfires often seriously injure young stems because of the thin bark.

COMMON NAMES

American basswood generally is known simply as basswood in forested areas, but may occasionally be called American linden. Several exotic species and hybrids of the genus (*Tilia*) are used for ornamental purposes throughout North America, and they are usually referred to as lindens.

RELATED COMMERCIAL SPECIES

Only two of the four recognized species of basswood (*Tilia*) occurring in North America are considered to be important forest trees. White basswood (*T. heterophylla* Vent.), found primarily at higher elevations in the east-central and southeast portion of the United States, is sometimes grouped with American basswood in inventory and production totals within those areas. Carolina basswood (*T. caroliniana* Mill.) and Florida basswood (*T. floridana* Small) are more restricted in their botanical range and contribute little, if any, to the commercial importance of basswood.

SUPPLY

In 1963 the net volume of basswood growing stock in the United States was estimated at about 3 billion cubic feet. Eighty percent of this volume is located in the Middle Atlantic and Lake States. Basswood makes up 5 percent of all hardwood growing stock in the Lake States and 3 percent in the Middle Atlantic region. In all other regions it represents less than 1 percent.

About 8 billion board feet of sawtimber trees is included in the total growing stock. Three-fourths of this sawtimber is located in the states of New York, Pennsylvania, West Virginia, Minnesota, Michigan, and Wisconsin.

PRODUCTION

Domestic annual production of basswood lumber reached its peak in 1909 with a reported production of almost 400 million board feet. Since then, production has been generally declining with slight periods of recovery in the mid-1920's and again in the early 1940's and mid-1950's. Production has remained fairly stable during the past 10 years (1960–1969) with an average annual production of about 73 million board feet (fig. 4).

About 29 million square feet (surface measure) of basswood veneer was produced for use by manufacturing industries in 1965 as compared to 20 million square feet in 1960. Only half a million square feet (3/8-inch basis) of basswood plywood was used in manufacture as compared to almost 2 million square feet in 1960. Basswood bolts (8-foot logs and shorter) used in manufacture increased in 1965 to 2.9 million board feet (lumber equivalent) from 1.7 million in 1960.

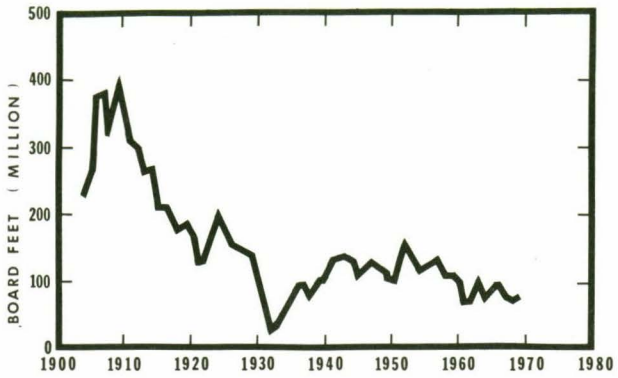

Figure 4.—Lumber production of basswood, 1904–1969.

CHARACTERISTICS AND PROPERTIES

The sapwood of basswood is whitish to creamy white and merges gradually into the pale brown or reddish heartwood which may also have darker streaks. The growth rings on plain sawed surfaces are generally faint and difficult to see with the naked eye. Numerous small pores are evenly distributed. These are distinctly visible with a hand lens. When dry, the wood is without odor or taste. Basswood is soft and light in weight (20 to 30 pounds per cubic foot, air dry), and has fine, even texture. It is easily worked with tools and is often a preferred wood for carving. It drys readily (kiln or air) but shrinks greatly in width and thickness during drying. When dry, it is fairly stable and does not warp when in use. It does not split easily in nailing but is low in nail-holding ability and resistance to decay. It bonds well with different glues under a moderately wide range of gluing conditions. The comparatively low toughness of basswood makes it difficult to bend without excessive breakage. Basswood lumber is relatively low in numbers of knots and other miscellaneous defects. It has good paint-holding ability and is adaptable to stenciling or grain printing.

PRINCIPAL USES

Basswood is used mainly for lumber, veneer, and bolts. Only a minor amount is used in mixture with other hardwood species for pulp and other fiber products.

In 1965, about half the basswood lumber was used in the manufacture of dimension stock and furniture. The light color of the wood, the freedom from warping and good gluing qualities make it especially desirable for concealed furniture parts. Basswood lumber is also used in the manufacture of burial caskets; mobile homes; millwork; shade and map rollers; signs and advertising displays; and toys and sporting goods. During recent years, there has been an increased use of paperboard containers which has decreased the demand of basswood lumber for boxes. Venetian blind slats were once made almost exclusively of basswood lumber, but this market has practically vanished. Minor

amounts of basswood lumber are used for specialty products such as apiary supplies, woodenware, and novelties.

About half the basswood veneer is used in the manufacture of plywood. A third of the basswood veneer is used directly in the manufacture of furniture and fixtures. It is a preferred veneer for baskets and wirebound crates because of its clean appearance and lack of taste or odor. Basswood veneer is also used in the manufacture of luggage, millwork, musical equipment, and sporting goods.

Most of the basswood plywood is used to produce sporting and athletic goods. Minor amounts are used in manufacturing furniture, luggage, toys, and millwork.

Basswood bolts (8-foot logs and shorter) are used in the manufacture of furniture parts, millwork, wirebound boxes and crates. Basswood bolts cut in 36 to 56-inch lengths are often preferred for making excelsior because the wood is light in weight and color, free from odor, and capable of being shaved into tough, resilient, thin strands. Minor amounts of basswood bolts are still used for making slack cooperage for containers, although this use is decreasing.

The inner bark of basswood is often used by handicraft producers and home hobbyists for weaving chair seats and baskets. Basswood, although lacking in grain pattern, is also a preferred wood for wood carvings.

REFERENCES

Colman, Donald G.
1966. Woodworking factbook; basic information on wood for wood carvers, home workshop craftsmen, tradesmen, and instructors. New York: Robert Speller and Sons. 240 p., illus.

Gill, Thomas G.
1965. Wood used in manufacturing industries. 1960. U.S. Forest Serv. Sta. Bull. 353. 121 p., illus.

————, and Phelps, Robert B.
1969. Wood used in manufacturing industries. 1965. U.S. Forest Serv. Sta. Bull. 440. 101 p., illus.

Godman, R. M., and Books, D. J.
1971. Influence of stand density on stem quality in pole-size northern hardwoods. U.S. Forest Serv. North Cent. Forest Exp. Sta. Res. Report NC–54. 7 p., illus.

Harlow, W. M., and Harrar, E. S.
1958. Textbook of dendrology. Covering the important forest trees of the United States and Canada. 4th Ed. New York, Toronto, and London: McGraw-Hill Book Co., Inc. 561 p., illus.

Heit, C. E.
1967. Propagation from seed. Part 7: Germinating six hard-seeded groups. American Nurseryman CXXV (12): 10–12, 37–41, 44–45 (June 15).

Little, E. L., Jr.
1953. Check list of native and naturalized trees of the United States (including Alaska). U.S. Forest Serv. Agr. Handb. 41. 472 p.

Panshin, A. J., *et al*
1962. Forest products—their sources, production, and utilization. New York: McGraw-Hill Book Co., Inc. Ed. 2, 538 p., illus.

Panshin, A. J., Zeeuw, Carl de, and Brown, H. P.
1964. Textbook of wood technology, Vol. I. Structure, identification, uses, and properties of the commercial woods of United States. New York: McGraw-Hill Book Co., Inc. Ed. 2, 643 p., illus.

Society of American Foresters.
1954. Forest cover types of North America (exclusive of Mexico). Report of Com. on Forest Types, Washington, D.C. 67 p., illus.

Steer, Henry B.
1948. Lumber production in the United States. 1799–1946. U.S. Dep. Agr. Misc. Publ. No. 669. 233 p.

Stroempl, G.
1971. Planting of basswood is successful in hardwood cutovers. U.S. Forest Serv. Tree Planters Notes 22(1): 26–29.

U.S. Bureau of Census.
1946–1969. Current industrial reports. Lumber production and millstocks. U.S. Dep. of Com. annual reports.

U.S. Forest Products Laboratory.
1955. Wood handbook. U.S. Dep. Agr. Agr. Handb. No. 72. 528 p., illus.

U.S. Forest Service.
1948. Woody-plant seed manual. U.S. Forest Serv. Misc. Publ. 654. 416 p., illus.

————.
1958. Timber resources for America's future. U.S. Dep. Agr. Forest Res. Report 14. 713 p., illus.

————.
1965a. Silvics of forest trees of the United States. U.S. Forest Serv. Agr. Handb. 271. 762 p., illus.

————.
1965b. Timber trends in the United States. U.S. Dep. Agr. Forest Res. Report 17. 235 p., illus.

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